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10/748,535

12/29/2003

Robert T. Weverka

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07/20/2004

TOWNSEND AND TOWNSEND AND CREW, LLP
TWO EMBARCADERO CENTER
EIGHTH FLOOR
SAN FRANCISCO, CA 94111-3834

EXAMINER

PAK, SUNG H

ART UNIT

PAPER NUMBER

2874

DATE MAILED: 07/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|--------------------------------------|---------------------------------------|--|
| Office Action Summary | Application No. 10/748,535 | Applicant(s) WEVERKA ET AL. | |
| | Examiner Sung H. Pak | Art Unit 2874 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 December 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 30-34 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 30-32 and 34 is/are rejected.
- 7) ☒ Claim(s) 33 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 29 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION***Information Disclosure Statement***

Information disclosure statement filed 12/29/2003 has been considered by the examiner.

Please refer to the initialed copy of PTO-1449.

Claim Rejections - 35 USC § 102

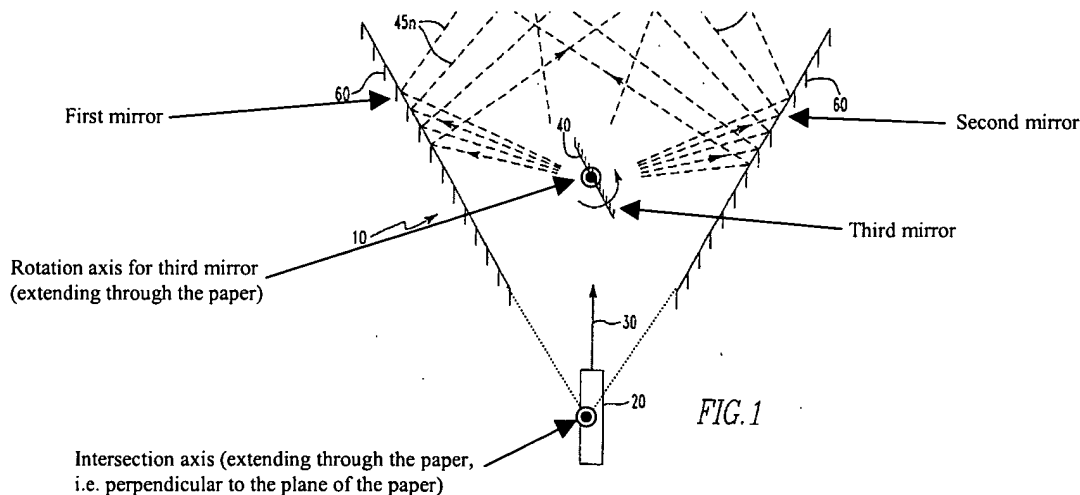
The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claim 30 is rejected under 35 U.S.C. 102(b) as being anticipated by Welch (US 5,565,686).



Art Unit: 2874

Welch discloses an optical device with all the limitations set forth in the claims including: first and second flat mirrors, fixed at a particular included angle with respect to one another (figure above); said first and second flat mirrors defining an intersection axis (figure above); a third flat mirror mounted for rotation about a rotation axis parallel to the intersection axis (these axes are parallel as shown in the figure above); an actuator coupled to the third flat mirror configured to provide first and second angular positions about the rotation axis (column 4 lines 51-53); the first angular position being such to define an included angle of approximately 90 degrees between the first and third flat mirrors, the second angular position being such to define an included angle of approximately 90 degrees between the second and third flat mirrors (column 4 lines 51-53, column 4 lines 39-42). Since the third mirror rotates 360 degrees, first and second angular positions that define 90 degrees angle is inherently disclosed.

Claim 31 is rejected under 35 U.S.C. 102(e) as being anticipated by Kalman et al (US 6,424,756 B1)

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

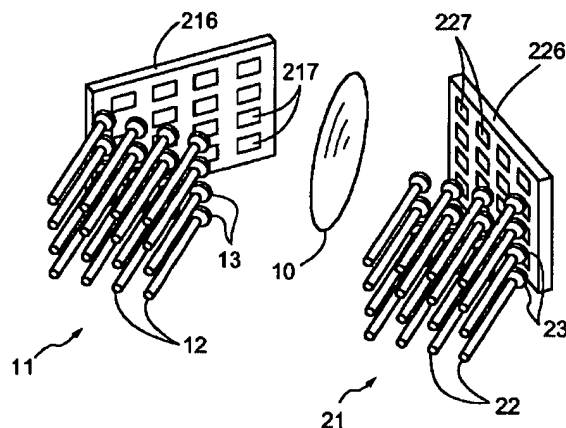


FIG. 4

Kalman discloses an optical device with all the limitations set forth in the claims including: a support element having first and second mounting surfaces lying in planes defining an angle therebetween of approximately 90 degrees ('216', '226' figure above); first and second MEMS micromirror arrays disposed on respective first and second substrates, mounted to the first and second mounting surfaces of the support element ('217', '227'; column 7 lines 29-30); a given micromirror in the first array being associated with a plurality of M micromirrors in the second array (column 7 lines 21-25); an actuator coupled to each given micromirror in the first array to provide M discrete orientations of the given micromirror, each orientation directing light along an incident direction toward different micromirror in the second array (column 7 lines 21-28); the plurality of M micromirrors in the second array having respective orientations such that each respective orientation is substantially 90 degrees to the orientation of the given mirror in the first array when the given mirror is oriented to direct light to that micromirror in the second array (see figure above). Since the input and output fibers ('12' and '22') are arranged in parallel, the orientation of the first mirror array is necessarily 90 degrees with respect to the orientation of the second mirror array in order to transmit light beam from the input fibers to the output fibers.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 32 is rejected under 35 U.S.C. 103(a) as being obvious over Kalman et al (US 6,424,756 B1) in view of Ackley et al (US 5,489,988).

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter

Art Unit: 2874

disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Kalman discloses an optical device as discussed above.

However, Kalman does not explicitly show the use of V-block as a support means for reflectors.

The use of V-block for supporting means is known in the art. Ackley explicitly teaches the use of V-block (Fig. 5) for supporting a reflective layer ('71') such that optical beams are coupled from the input fibers to the output fibers. The use of V-block is considered advantageous in the art because it allows for precise and secure positioning of optical elements, which enhances optical alignment and decreases optical loss.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Kalman device to have V-block for supporting its reflectors.

Art Unit: 2874

Claim 34 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kalman et al (US 6,424,756 B1).

Kalman discloses an optical device as discussed above.

However, Kalman does not explicitly teach the micromirrors' deflection being limited to $\pm 10^\circ$.

Ordinarily, differences in range will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such range is critical. "[W]here the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation." In re Aller, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1955). *Since the general condition of the claimed limitation is disclosed in the prior art, the optimal range of $\pm 10^\circ$ is prima facie obvious, unless there is evidence indicating such range is critical. Also see MPEP 2144.05.*

Deflection angle being limited to $\pm 10^\circ$ is considered advantageous and desirable in the art because small angle of deflection reduces the required driving voltage of the MEMS mirrors and reduces excessive energy consumption. Further, limited deflection angle reduces over-actuation of MEMS mirrors which may be caused by mirrors momentum, and it enhances alignment of transmitted optical beams.

Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Kalman device to have its micromirrors' deflection angle limited to $\pm 10^\circ$.

Allowable Subject Matter

Claim 33 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: as discussed above, a configurable retroreflector array having a support element with first and second mounting surfaces laying in approximately 90 degrees; first and second MEMS micromirror arrays disposed on the mounting surfaces; and an actuator coupled to each given micromirror in the first MEMS array to provide M orientations to direct light along an incident direction toward second MEMS array is known in the art.

However, none of the prior art fairly teaches or suggests such a configurable retroreflector, further having a prism having support surfaces facing away from each other, and the first and second MEMS array being mounted *between the support surfaces and mounting substrates* which are disposed on support surfaces.

Conclusion

Following references made of record and not relied upon are considered pertinent to applicant's disclosure. Blair et al (US 20040022482A1), Burroughs et al (US006580846B1), Engelberth et al (US006393187B1), and Ramaswami et al (US006571030B1) disclose MEMS micromirror arrays disposed on mounting substrates which are 90 degrees apart for routing optical beams between input fibers and output fibers. However, the effective filing date of the instant application antedates effective filing dates of the references. Frye et al (US

Art Unit: 2874

20030091268A1), and Tedesco (US20010046350A1) disclose dynamically configurable retroreflector having three mirrors, in which the third mirror is actuated to defined 90 degrees angular positions with the first or the second mirrors. However, the effective filing date of the instant application antedates effective filing dates of the references.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sung H. Pak whose telephone number is (571) 272-2353. The examiner can normally be reached on Monday- Friday, 9AM-5PM.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sung H. Pak
Examiner
Art Unit 2874

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